WHAT IS CLAIMED IS:

1. A control apparatus for a valve actuating system which is operable to lift an intake valve or an exhaust valve of an internal combustion engine and includes a lift characteristic changing mechanism for changing a lift characteristic of the intake valve or the exhaust valve, comprising a controller that:

calculates a target operation value of the lift characteristic changing mechanism;

calculates a realizable range of the operation value which can be realized by the lift characteristic changing mechanism, based on a controlled variable that can be given to the lift characteristic changing mechanism and at least one parameter related to an environment surrounding the lift characteristic changing mechanism; and

calculates a new target operation value of the lift characteristic changing mechanism to be within the realizable range of the operation value when the target operation value is not within the realizable range of the operation value.

2. The control apparatus according to claim 1, wherein the lift characteristic changing mechanism comprises a mechanism that is operable to change a lift amount of the intake valve.

3. The control apparatus according to claim 1, wherein the lift characteristic changing mechanism comprises a mechanism that is operable to change a phase of a lift stroke of the intake valve relative to a piston stroke of the internal combustion engine.

4. The control apparatus according to claim 1, wherein:

the controller stores a physical model that is usable for calculating a range of the operation value of the lift characteristic changing mechanism, based on the controlled variable that can be given to the lift characteristic changing mechanism

and said at least one parameter related to the environment surrounding the lift characteristic changing mechanism; and

the controller calculates the realizable range of the operation value of the lift characteristic changing mechanism, based on the physical model.

5. The control apparatus according to claim 1, wherein:

the lift characteristic changing mechanism comprises an actuator that is driven by electric power; and

the at least one parameter comprises at least one selected from a temperature of the actuator, an operating position of the actuator, an operating velocity of the actuator, an operating acceleration of the actuator, and an engine speed.

6. The control apparatus according to claim 1, wherein:

the lift characteristic changing mechanism comprises an actuator that is driven by a pressure of oil delivered from a hydraulic pump; and

the at least one parameter comprises at least one selected from a hydraulic pressure, an oil temperature, operating characteristics of the hydraulic pump, and an engine speed.

7. A control apparatus for a valve actuating system which is operable to lift an intake valve or an exhaust valve of an internal combustion engine, and includes a first lift characteristic changing mechanism for changing a first lift characteristic of the intake valve or the exhaust valve and a second lift characteristic changing mechanism for changing a second lift characteristic of the intake valve or the exhaust valve, comprising a controller that:

calculates a target operation value of each of the first and second lift characteristic changing mechanisms;

calculates a realizable range of the operation value that can be realized by each of the first and second lift characteristic changing mechanisms, based on at

least one condition related to an operation of said each lift characteristic changing mechanism; and

calculates a new target operation value to be within the realizable range of the operation value when the target operation value is not within the realizable range of the operation value.

8. The control apparatus according to claim 7, wherein when the target operation value of one of the first lift characteristic changing mechanism and the second lift characteristic changing mechanism is not within the realizable range of the operation value, the controller calculates a new target operation value of the one of the first and second lift characteristic changing mechanisms to be within the realizable range of the operation value, and calculates a new target operation value of the other of the first and second lift characteristic changing mechanisms, based on the new target operation value of the one of the first and second lift characteristic changing mechanisms.

9. The control apparatus according to claim 7, wherein the first lift characteristic changing mechanism comprises a mechanism that is operable to change a lift amount of the intake valve, and the second lift characteristic changing mechanism comprises a mechanism that is operable to change a phase of a lift stroke of the intake valve relative to a piston stroke of the internal combustion engine.

10. The control apparatus according to claim 7, wherein said at least one condition comprises a controlled variable that can be given to said each lift characteristic changing mechanism, and at least one parameter related to an environment surrounding said each lift characteristic changing mechanism.

11. The control apparatus according to claim 10, wherein:

the controller stores a physical model that is usable for calculating a range

of the operation value of each of the first and second lift characteristic changing mechanisms, based on the controlled variable that can be given to said each lift characteristic changing mechanism and said at least one parameter related to the environment surrounding said each lift characteristic changing mechanism; and

the controller calculates the realizable range of the operation value of said each lift characteristic changing mechanism, based on the physical model.

12. A method of controlling a valve actuating system which is operable to lift an intake valve or an exhaust valve of an internal combustion engine and includes a lift characteristic changing mechanism for changing a lift characteristic of the intake valve or the exhaust valve, comprising the steps of:

calculating a target operation value of the lift characteristic changing mechanism;

calculating a realizable range of the operation value which can be realized by the lift characteristic changing mechanism, based on a controlled variable that can be given to the lift characteristic changing mechanism and at least one parameter related to an environment surrounding the lift characteristic changing mechanism; and

calculating a new target operation value of the lift characteristic changing mechanism to be within the realizable range of the operation value when the target operation value is not within the realizable range of the operation value.

13. A method of controlling a valve actuating system which is operable to lift an intake valve or an exhaust valve of an internal combustion engine, and includes a first lift characteristic changing mechanism for changing a first lift characteristic of the intake valve or the exhaust valve and a second lift characteristic changing mechanism for changing a second lift characteristic of the intake valve or the exhaust valve, comprising the steps of:

calculating a target operation value of each of the first and second lift characteristic changing mechanisms;

calculating a realizable range of the operation value that can be realized by each of the first and second lift characteristic changing mechanisms, based on at least one condition related to an operation of said each lift characteristic changing mechanism; and

calculating a new target operation value to be within the realizable range of the operation value when the target operation value is not within the realizable range of the operation value.

14. The method according to claim 13, wherein when the target operation value of one of the first lift characteristic changing mechanism and the second lift characteristic changing mechanism is not within the realizable range of the operation value, a new target operation value of the one of the first and second lift characteristic changing mechanisms is calculated to be within the realizable range of the operation value, and a new target operation value of the other of the first and second lift characteristic changing mechanisms is calculated, based on the new target operation value of the one of the first and second lift characteristic changing mechanisms.